



Technical Memorandum

TO: Karin Hilding, PE
FROM: Brandon Theis, PE
SUBJECT: Riverbend Path Evaluation
DATE: July 15, 2013

Dear Karin:

The purpose of this technical memorandum is to evaluate an alternative route option for connecting the existing path elements at Kay Beller Park with the existing BNSF Loop Trail System. To date, two routes have been determined and can be summarized as follows:

1. **Riverbend Route – Original Option (Conceptual Design by Bruce Boody Landscape Architects).** This route will run along the Whitefish River; between the river and the Riverbend Condos. This route would require extensive river permitting efforts. Since there is not enough available shoreline available to construct a path (condo patio to water's edge distances are as little as 6-feet), boardwalks or fill will need to be constructed out into the river for this route.
2. **Miles Avenue Route – Alternative Option (Conceptual Design by Robert Peccia and Associates).** This route will start near the eastern bank of the Whitefish River (below the HWY 93 Bridge) and will run northerly along the western edge of Miles Avenue. This route will require multiple switchbacks and several retaining walls.

This technical memorandum will summarize applicable AASHTO (shared use path) and ADA (sidewalk) design criteria and standards. In addition to this, the design criteria that were used for the development of the Miles Avenue route will be summarized.

PATH GUIDELINE SUMMARIES

Summary of Shared Use Path Design Criteria

The *AASHTO Guide for the Development of Bicycle Facilities – 2012, Fourth Edition, Chapter 5, Design of Shared Use Paths*, has been selected as the design guideline for the shared use path. The following is a summary of the applicable guidelines:

Path Width: 10 – 14 feet
 Shoulder: Minimum 2-foot graded shoulder with a maximum 1V:6H slope
 Clear Zone: Minimum clear zone of 2-feet
 Guardrail Requirements: Physical barriers or rails are recommended for the following situations:

- Slopes 1V:3H or steeper, with a drop of 6 ft or greater;
- Slopes 1V:3H or steeper, adjacent to a parallel body of water or other substantial obstacle;
- Slopes 1V:2H or steeper, with a drop of 2 ft or greater; and
- Slopes 1V:2H or steeper, with a drop of 1 ft or greater.

Vertical Clearance: Minimum vertical clearance of 8-feet
 Design Speed: 12 – 30 mph
 Minimum Radius: 27 – 166 feet
 Cross Slope: 2.0% - 1.0%

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Grade: Maximum grade of 5.0% in open space;
When parallel to roadway, do not exceed roadway grade.
Stopping Sight Distance: Varies, see 5.2.8.

Summary of Sidewalk Design Criteria

The *AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities* – July 2004 Edition, Chapter 3.2, *Sidewalk Design*, has been selected as the design guideline for the sidewalk. In general, this guideline mimics current American's with Disabilities Act (ADA) guidelines.

Sidewalk Width: Minimum of 4-feet
Clear Zone: Minimum of 2-feet
Vertical Clearance: Minimum vertical clearance of 8-feet
Cross Slope: Maximum cross slope of 2.0%
Grade: Maximum grade of 5.0%;
Maximum grade of 8.3% for ramps with landings;
When parallel to roadway, do not exceed roadway grade;

PATH EVALUATION

Miles Avenue Route (Alternative Option) – Option Development & Design Criteria Evaluation

As directed, RPA has developed an alternative route for a path along the western edge of Miles Avenue. It is very important to mention that this option does not meet the requirements of a Shared Use Path. It must be noted that RPA does not recommend the encouragement of both bicycles and pedestrians on this facility, if constructed. This conceptual design was developed to meet the minimum sidewalk requirements summarized above.

Sidewalk Width: 8-feet
Sidewalk Clear Zone: 2-feet
Vertical Clearance: 8-feet (beneath new MDT Bridge)
Cross Slope: Maximum cross slope of 2.0%
Grade: 0.0% to 5.0%

Please see the enclosed conceptual design exhibit of this option.

As shown on the enclosed exhibit, the route will start beneath the new MDT HWY 93 Bridge, where it will connect to the end of the Kay Beller Park path extension, being constructed with the "Whitefish West" project. From that location, the route will follow 4 switchbacks, gaining elevation as it moves away from the Whitefish River. The route will then cross the southern driveway approach to the Riverbend Condos as it transitions to follow along the western side of Miles Avenue. The route will continue along Miles Avenue to Railway Street where it will turn west and connect to the existing BNSF Loop Trail System.

The switchback area will achieve longitudinal grades of 5.0%. Many tall retaining walls will need to be constructed to complete the switchback construction. It is recommended that these walls are cast-in-place concrete. Approximately 75 linear feet of straight curb (aka "A" curb) is recommended along the top switchback to delineate the path from the Riverbend Condo driveway.

The Miles Avenue section of this route will match the longitudinal grade of the roadway. It is estimated that the maximum grade of this segment will be approximately 10-12%. One tall (over 10-feet high) retaining wall and approximately 200 linear feet of curb and gutter will be required to a sidewalk along this route.

It is recommended that this entire route is constructed of cast-in-place concrete. All retaining walls will require hand rails.

RECOMMENDATIONS AND ALTERNATIVES

The Miles Avenue Route is also likely to face several of the following challenges:

1. High construction cost in comparison to a typical path or sidewalk route.
2. Some permitting to perform construction activities along the Whitefish River. Based on the conceptual design, it is likely that the following permits will need to be obtained:
 - a. Floodplain Development Permit (City of Whitefish)
 - b. 124 Permit for river bank impacts (Montana Fish, Wildlife and Parks)
3. Securing a sizeable easement from the Riverbend Condos. The existing easement along the river could be traded for an easement between the bridge and condos.
4. This route would not be as scenic as a route that follows the river.
5. This route would not be as enjoyable to users due to the steeper grades and switchbacks.

In summary, it is clear that the Miles Avenue Route will have many challenges. With that said, it is difficult for us to recommend this option at this time. Further analysis would need to be performed (i.e. cost analysis, permitting research and condo owner outreach activities) to determine if this option would best serve the needs of the City and users.

It is important to reiterate that the Miles Avenue Route could meet current AASHTO sidewalk and ADA guidelines when the route is classified as "accessible". There are other alternatives that could be pursued if the route was to not meet the "accessible" criteria. For example, stairs could be installed to get users up to Miles Avenue. Accessories could be added to stairs to assist bicyclists such as a bicycle sidewalk track (see photo). Another example would be to have fewer switchbacks and steepen the route. If any of these ideas are appealing, please let us know as we are available to further analyze them. We understand how important it is to the city and its citizens to connect the Kay Beller Park to the BNSF Loop Trail System.



Thank you and please let me know if you have any questions,

Brandon Theis, PE, LEED AP
Project Manager

Enclosures

Cc: John Wilson, PE – City of Whitefish, Public Works Director
Bruce Boody, RLA, ASLA, CSLA – Bruce Boody Landscape Architect Inc.
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